



Examining Individual Factors to Explain Overdue A1Cs in Patients with Type 2 Diabetes– A Multnomah County Diabetes Project

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Background

Over 30 million people in the United States have type 2 diabetes. Patients are not achieving the recommended control to prevent complications. The American Diabetes Association (ADA) recommends visits every 3 to 6 months depending on A1C level. Worse diabetes outcomes are seen in minorities and individuals in poverty. Numerous resources related to the social determinants of health (SDOH) are related to diabetes status and those with less available socioeconomic resources have worse disease control.

Problem

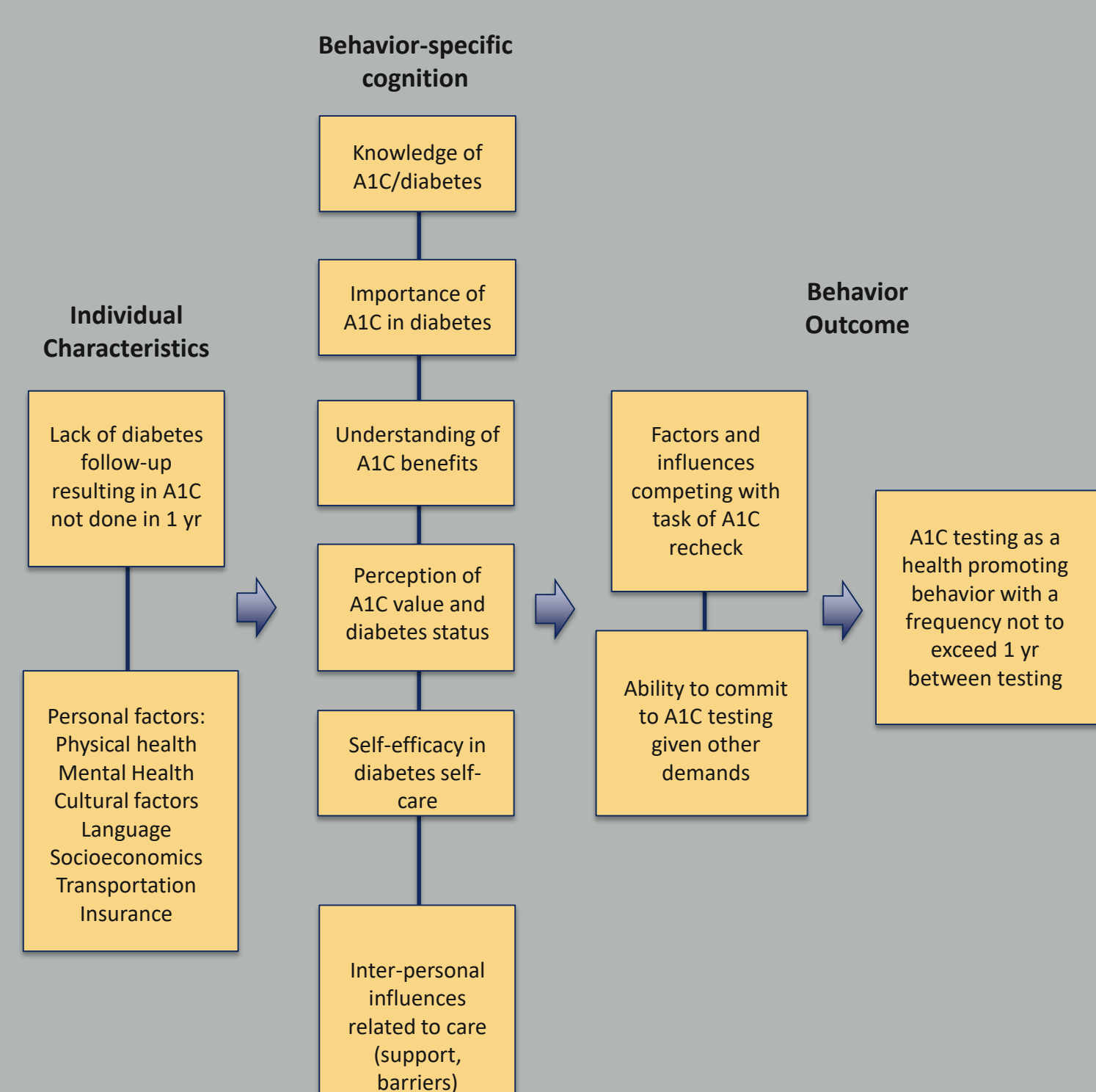
Multnomah County Health Centers (MCHCs) treat a population with a high number of underserved minority groups and people who are near or below the poverty line. Some of the patients with type 2 diabetes are not receiving regular diabetes care, specifically return visits for A1C testing. Numerous patients are greater than 1 year since their last A1C check, far beyond the recommended timeframe put forth by the ADA. Frequent diabetes-related appointments also help with other care elements important to diabetes like blood pressure, lipids, and other metrics.

Purpose

The Health Resources & Services Administration (HRSA) provides federal funding to the Multnomah County Health Department (MCHD) to help with care of underserved populations. HRSA requested MCHCs to examine patients with type 2 diabetes and greater than 1 year between A1C rechecks. The goal of this examination was to learn more about these patients in order to find ways to correct overdue A1Cs.

Framework

A modified schema of the Health Promotion Model was used to hypothesize the individual patient factors surrounding the process of missed A1C rechecks. A1C value is known to be impacted by SDOH, but frequency of A1C testing is not typically studied. It was suspected that the same SDOH would impact a patient's ability to get their A1C rechecked. Both subjective and objective measures were important to collect in this project.

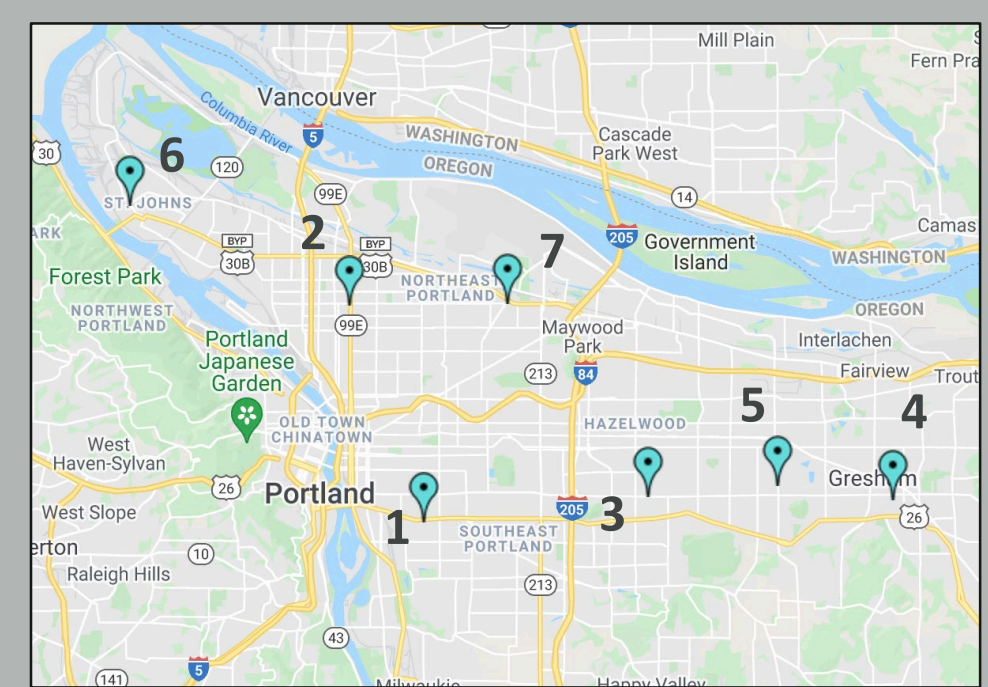


Methods

Setting

Patients from 7 primary care MCHCs were surveyed by primary care medical assistants (PCMAs) using an A1C survey designed by the Integrated Clinical Services (ICS) department. The MCHCs included:

- 1) Southeast Health Center (SEHC)
- 2) Northeast Health Center (NEHC)
- 3) Mid-County Health Center (MCHC)
- 4) East County Health Center (EHC)
- 5) Rockwood Health Center (RWHC)
- 6) North Portland Health Center (NPHC)
- 7) La Clinical Health Center (LCHC)



Participants

- 172 surveyed, 164 patients used meeting such criteria:
- Must be 18 years or older
 - Must have type 2 diabetes (excluding 8 patients who had either pre-diabetes or type 1 diabetes)
 - Must be a current patient of a MCHC

Separated into two groups:

- 1) Gap between A1C checks >1 year dating back to December 1st 2017; known as **"overdue"; n=97**
- 2) Gap between A1C checks <1 year dating back to December 1st 2017; known as **"on-time"; n=67**

Intervention

- 1) Analyze the survey responses with descriptive and inferential statistics finding common themes

Survey Question Topics: duration of diabetes, diabetes knowledge, A1C knowledge, A1C recall, barriers to A1C rechecks, stress or depression affecting diabetes care

- 2) Conduct a retrospective/prospective chart review from the Epic electronic medical record (EMR) using the completed survey date as the starting point

Separate the chart review variables into 5 categories: Demographic, patient care logistics, understanding of illness, physical health, and mental health

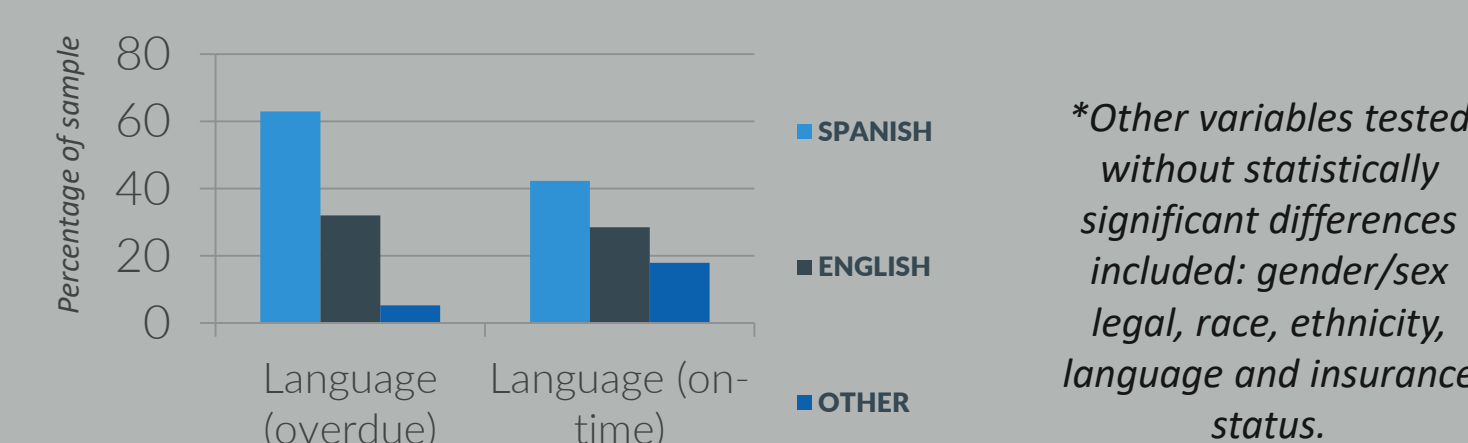
Data Analysis

Use measures of central tendency (most commonly mean) and frequencies/percentages to compare between the two groups. Chi-squared measurements (with Bonferroni correction), independent t-tests, and paired t-tests as inferential statistics comparing groups.

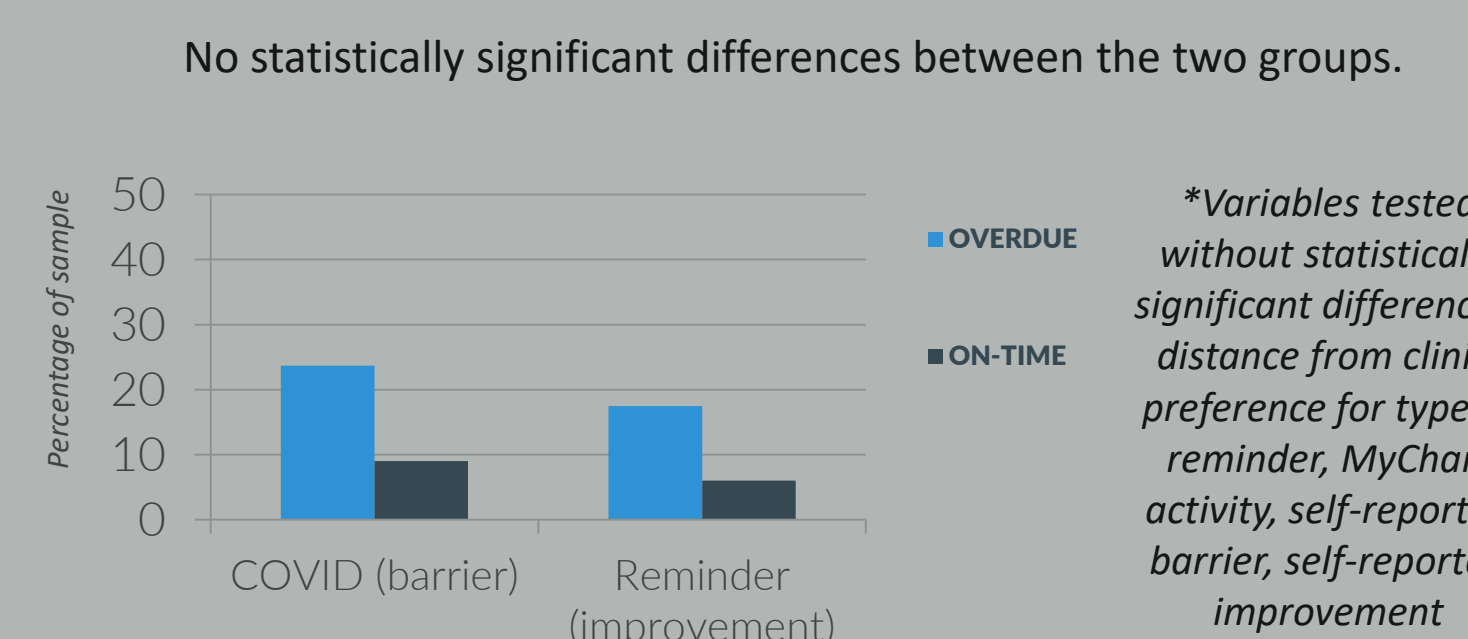
Findings

Demographic

CLINIC- More patients in overdue from ECHC 32% (31/97) vs 6% (4/67); less overdue in SEHC 6.2% (6/97) vs 26.9% (18/67)
AGE- average 49.9yo (overdue) vs 55.6yo (on-time)
BMI- average 35.6 (overdue) vs 31.9 (on-time)

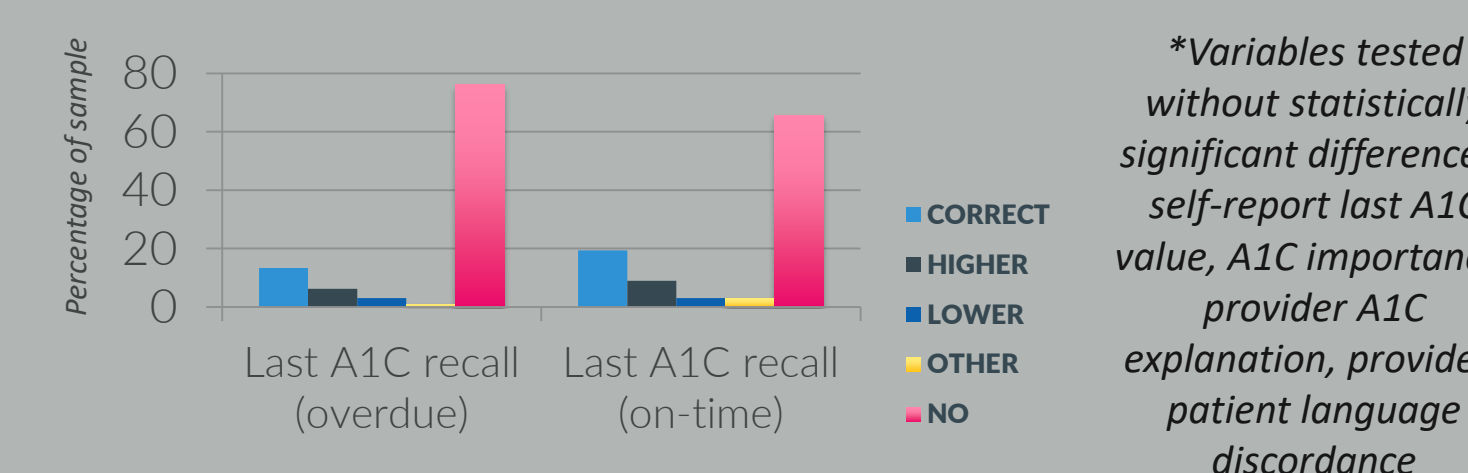


Patient Care Logistics



Understanding of Illness

A1C overdue had more detailed answers to knowledge question on survey 38.1% (37/97) versus 10.4% (7/67)
A1C on-time more likely to visit diabetes RN dating back to Dec 1st 2017, 65.7% (44/67) vs 47.4% (46/97)



Physical Health

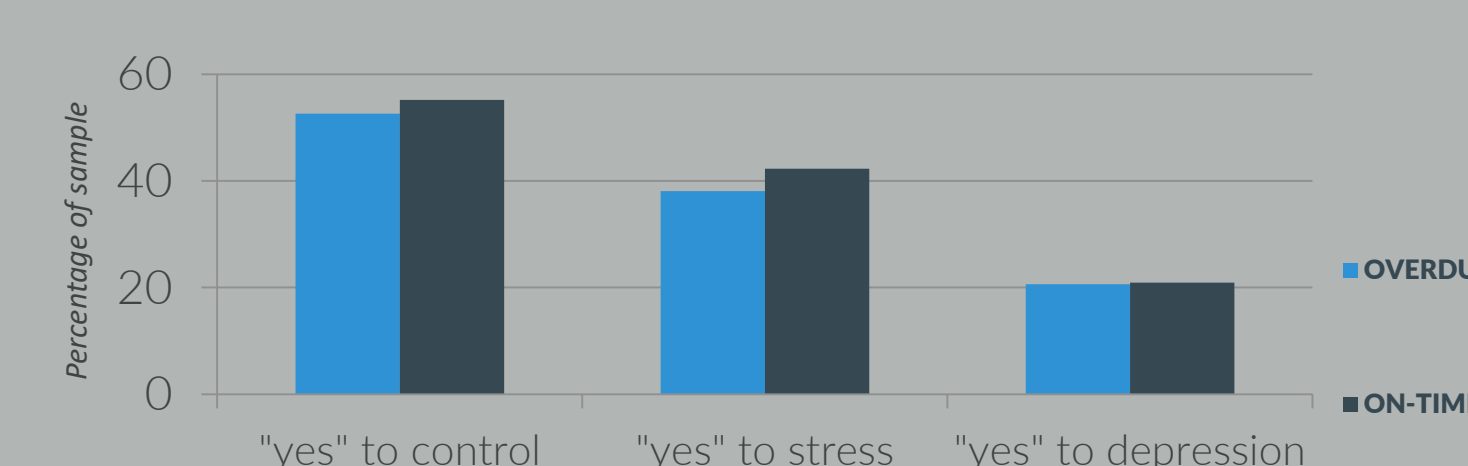
A1C overdue had more with diabetes for 1-3 years (19.6% vs 3.0%)
A1C overdue had lower A1C before survey at 8.7% vs 9.7%; overdue group also had less patients >9% (41.2% vs 65.7%)
A1C overdue had less diabetes complications per person (0.51 vs 0.78), less total medications (6.6 vs 8.7), less diabetes medications (1.51 vs 1.96), and less likely to use insulin (26.8% vs 46.3%)

*Variables without significant differences: chronic conditions, blood pressure, lipids, tobacco use status

Mental Health

No statistically significant differences between the two groups.
Variables tested: self-reported diabetes control, stress, depression, mental health diagnosis, diagnosis of depression or anxiety, use of behavioral health appointment

Below is graph depicting answers to survey questions: Do you feel like you have control over your diabetes? Do you have stress affecting your diabetes management? Do you have depression affecting diabetes management?



Discussion

Interpretation

Clinic Differences- Greater percentage of people in the A1C overdue group at ECHC, less at SEHC
All 24 patients from NEHC had A1C>9%

It is important to understand that this was not a random sample, but does this actually portray a true difference among patients in the different regions of Multnomah County? Further inquiry is needed at each clinic site.

Language Differences- Although the differences were not statistically different between the groups, the overdue group had more Spanish speakers (62.9% vs 42.3%); both groups had large numbers of non-English speakers (68.1% in overdue and 60.2% in on-time) which is greater than the MCHD known average of about 43.2% using a primary language other than English

This is important to consider when thinking about the complexity of diabetes in regards to explaining treatment and management. More research needs to be done assessing teaching and understanding in those with a primary language other than English.

Insurance Differences- Although not statistically significant, both groups had high numbers of uninsured individuals with 47.4% in the overdue group and 35.8% in the on-time group; this is much higher than the MCHD average of 17.2%

Again, this is important to consider when thinking about who needs diabetic management at the MCHCs. Many of these patients with diabetes have more challenges to overcome when compared to the general MCHD population. Access to services may need to be explored further in the overdue group.

Physical Health Differences- The A1C overdue group had a lower A1C before the survey (8.7% vs 9.7%), less diabetes complications, less total medications, less diabetes medications, and were less likely to be prescribed insulin for treatment

These were the most significant findings in the project. Before the survey, the A1C overdue group had better diabetes control with fewer complications. This showed that diabetes had a smaller impact on their life. One may suspect that if diabetes is less impactful on a person's life, they may be less inclined to seek care during a pandemic or more likely to forget an appointment.

Knowledge Deficit- In both groups over 60% of people did not know what their last A1C value was, but each group rated the importance as high; there were also more detailed answers to the knowledge of diabetes and A1C question in the overdue group

There was a discrepancy between the perceived knowledge, self-efficacy, and diabetes control when compared to actual diabetes status in both groups, but more so in the overdue group.

Missed A1C and Future Opportunities- 63/97 people in the overdue group had a repeat A1C during the data collection time-frame, 48/63 had an increase in A1C value, and 32/48 of the patients who increased A1C value went up by at least 1%; 32/97 patients who were in the overdue group had clinic contact during the overdue period, but an A1C was missed for various reasons

Improvements are needed by all MCHC staff to identify overdue A1C checks when patients are presenting for care. Partnerships with the dental clinic may be helpful for future A1C adherence.

Barriers and Improvements- More patients in the overdue group reported COVID-19 as a barrier and more in the overdue group wanted a reminder to get their A1Cs done; the A1C survey done by the PCMAs showed a statistically significant increase in appointments 3 months after the survey compared to 3 months before the survey; this difference was found in both groups

Outreach was shown to be effective at improving appointments among all patients. During a stressful time, patients may benefit from reminders for A1C testing. Even a telemed visit may allow for provider to explain the importance of type 2 diabetes management during the COVID-19 pandemic.

Conclusions

Strengths and Limitations

Strengths- sample size, comparison group, large amount of data, equal number of patients when separated by A1C value (84 pts >9%, 80 pts <9%), adjusted Chi-Squared models using Bonferroni correction for greater confidence in findings

Limitations- non-random sampling, mostly observational study, socioeconomic variables lacking, greater statistical significance required with Bonferroni may result in the potential for a type 2 error (saying there is not a difference when in fact there is actually a true difference)

Proposed Interventions

Shot-term- Together with the ICS team, it was determined that sending automated reminders for A1C rechecks would be a feasible intervention in the short-term.

*MCHD needed an intervention which would be feasible during the COVID-19 pandemic which had greatly diminished staff resources

Long-term- 1) Improve education regarding importance of A1C frequency and risk of A1C increase if delaying care, 2) Explore the perception of a patient's own diabetes status compared to what is recommended 3) Increase awareness of MCHC staff to complete opportunistic A1C testing including partnerships with dental clinics and at vaccine-related appointments, 4) Increase MyChart usage for further connectivity and easy patient access to medical records to increase current disease knowledge, 5) Look deeper at individual clinic differences using random sampling of A1C on-time and overdue patients in the respective MCHC, 6) Importance of diabetes management to decrease risk of COVID-19 complications

Implementation of Findings

- An automated phone message script was developed to inform patients to call MCHD to schedule a visit for a lab test, while at the same time complying to privacy standards

- This message was to be sent by a MCHD automated telephone vendor which was being used for already scheduled appointments

- One MCHD staff member would be needed to run a quarterly report from the Epic EMR. The report would contain type 2 diabetes patients who were 10 months overdue on A1C rechecks

- The automated vendor would use this report to begin sending messages to patients, but patients would be responsible to call back and schedule the appointments

Next Steps- the project was put on hold for two reasons:

1) The individual clinics needed to assess lab capacity given the possibility of an influx of patients, 2) The automated phone vendor being used at MCHD was in the process of changing and it was agreed to implement the intervention once with the new vendor in roughly 2 to 3 months instead of a implementing twice

Summary

This study illustrates how fragile diabetes control can be without consistent follow-up. The study also showed a variety of factors which may affect a person's ability to get A1C testing and the associations between these factors may be difficult to measure. Important findings with and without statistical significance pointed towards language, insurance, health knowledge, perception of illness, COVID-19, and diabetes status as important reasons why patients are missing A1C testing, but this is not a definitive list and is most helpful to guide future research. Once the automated phone intervention is implemented, a program evaluation will be needed to determine the effectiveness of the intervention. A special thanks goes out to MCHD ICS for requesting this project and all of the wonderful collaboration along the way.